START 06 JUNE 2000
JD 2451702.5

Mead

END 18 DEC 2000
JD 2451897.5

COMPOSITION

LOGBOOK # 64

100 sheets • 200 pages
9¾x7½ in/24.7 x 19.0 cm
college ruled • 09932

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B-101

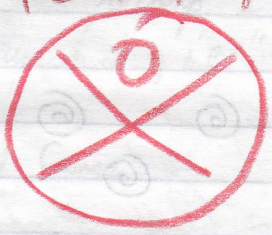
INNER SPACE: The α & The Ω

COLLEGE RULED

Zone one

"The ri"

(THE REALITY INTERFACE)



2000.158.2
06.06.2140

What is ri? What is the reality interface? It is the world as will and representation. My ri is a human ri with symbols, and yet the symbols that describe the silent level of reality are not the reality itself; in fact, the symbols that describe reality only describe the reality interface. They are abstractions of abstractions.

1. next SCIENCE FICTION book to be read: "The Third Force"
   ... a dark landscape of totalitarian rule and paranoia, a place where time, truth, and memory can be manipulated by men and machines...

2. Who is KATHY ACKER? She has been publishing books since the early 1970's principally under the imprints of American underground publishers.

3. FOUCAULT'S PENDULUM by UMBERTO ECO

As I have done in the past, I will not rigidly read one book at a time in sequential order; but instead, I will read a little of each here and there all at once pseudo-simultaneously. This is my ri. What I read in such a skizoid manner colors my ri.

2000.192.1
07.10.0000

The going-away-party for my nephew Joe today at his aunt Donna's was beautiful. I feel very close to the family my sister married into. My brother-in-law, Joe, arrived shortly after my nephew and I got there. I was very glad to see him, and I felt relieved when I understood that a truce was in full effect. There was a genuine peace.

Kathy Minichini, my brother-in-law's oldest sister, told her father Bill (Vito) that I was as much a part of the Minichini family as my sister Tami is. I was ~~somewhat~~ modest. I quickly dismissed the idea; and then, Lorie, my brother-in-law Joe's brother Vito's wife, told me that her deceased husband Billy (Vito) had nothing but good things to say about me. Lorie said that Billy had great respect for me, that he said I was an intelligent man.

Billy had hung himself in the Spring of 1999. I lived in the same room with Billy back in 1986 just before my first arrest.

I will write about this in my digital journal when I am in the mood.

I was very touched by the comment by Lorie. It makes a difference in the way I remember the past.

My nephew leaves for Illinois on Thursday. I can't even begin to imagine how much I will miss him. I know I must really love my sister and her husband for I am so close to the fruit of their attraction to each other. He is my nephew and my friend and my brother.

I think of Vito. I have, as I am sure everyone has today, thought about him a great deal today. I never knew how much Vito respected my intelligence. Perhaps he really did listen to me when I would speak while we passed the Sacred Pipe.

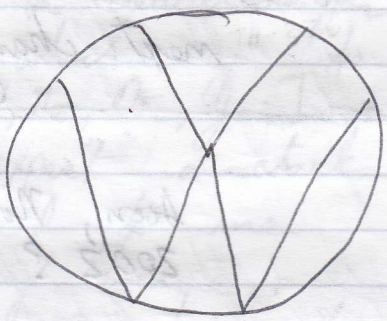
I listened as well. I recall so vividly when Vito said, "All this is just a memory."

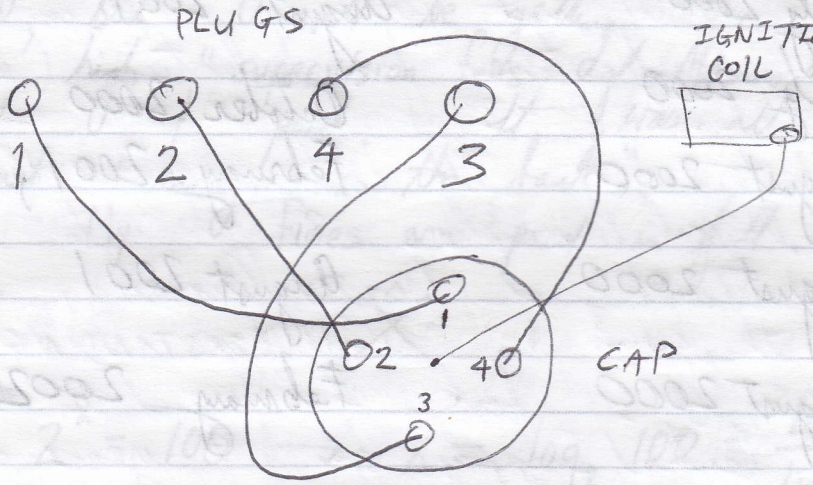
Perhaps others respect me as well, and I just don't realize it. I am so self-conscious and my ~~self~~ self image so low, I am always on the defensive.

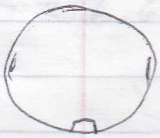
What Lorie said meant a great deal to me. I cherish this, and I do not take for granted the bond that has developed. I feel very welcome and "loved" by the Menichini family. This is the outcome of my sister's marriage. Perhaps marriage is not as bad as it is made out to be. I am a loner, but I may play a role in the larger scheme of things.

such peace of mind... this has been a great "Zen and the Art of Motorcycle Maintenance" experience.

During the rain, while changing the cap & rotor and plugs & wires, I was ~~stricken~~ stricken with fear as the car would not start - it back fired... I did not panic. I kept a scientific presence of mind and found that the rotor was not in correctly. Also, the plugs were not joined in the proper sequence.







The cap can only go in one way. There is a groove on the bottom, a ~~not~~ notch-like groove. As for the rotor, there is a little hump up inside it that sits in a groove. It must be pushed firmly down onto this so

$F + F = 1E$

Do not think $(15 + 15 = 30)_{10}$

$30/16 = 1$ r $14 \rightarrow E$

$1/16 = 0$ r 1

This is a habit caused by attachment to the decimal system. I want to see my way around the assembly process without the awkward conversion process.

So, see $(F + F)_{16}$ as serving the same function as $(9+9)_{10}$ or $(1+1)_2$.

$(1+1)_2 = 10_2$ (not a good example)

$(9+9)_{10} = 18_{10}$: 8 is $(9-1)$

$(F+F)_{16} = 1E$: E is $(F-1)$

but, alas, in binary, the pattern holds true

$(1+1)_2 = 10$: 0 is $(1-1)$ aha...

This is a crucial step in becoming firmly grounded in hexadecimal.

F + E = 1D

Do not think $15 + 14 = 29$; $29 - 16 = 13 \rightarrow D$

NO. – memorize $F + E = 1D$
and meditate on what happens with $(9 + 8 = 17)$

7 is $(8 - 1)$
D is $(E - 1)$

The pattern: anything added to F in hex follows the same pattern as anything added to 9 in decimal,
that is, the carry-over bit is 1,
and the sum bit is one less.

F + F = 1E
F + E = 1D
F + D = 1C
F + C = 1B
F + B = 1A
F + A = 19
F + 9 = 18
F + 8 = 17
F + 7 = 16
F + 6 = 15
F + 5 = 14
F + 4 = 13
F + 3 = 12
F + 2 = 11
F + 1 = 10

What about the others?
Are there other patterns?
Consider $(8 + 8 = 16)_{10}$

Consider E + E
resist converting, adding, converting
THINK
2 times E is 2 less than
2 times F, and 2 times F is 1E
Just as $2(9) = 18$ in base-10
and $2(8) = 16 = 18 - 2$
so, too, in hex,

$$E + E = 2(F) - 2$$
$$= 1E - 2 = 1C$$

Likewise, F + D = 1C

Consider exactly why $F + D = 1C$

just as $(9 + 3 = 12)_{10}$?

$E + E = 1C$
$E + D = 1B$
$E + C = 1A$
$E + B = 19$
$E + A = 18$
$E + 9 = 17$
$E + 8 = 16$
⋮
$E + 2 = 10$
$E + 1 = F$

Think, "E is $10_{16} - 2$"

Therefore

$E + B = 10 + B - 2$
$= 1B - 2 = 19_{16}$

$F + C = 1B = E + D$ ✓
$F + D = 1C = E + E$ ✓

$F + B = 1A = E + C = D + D$

D is 3 less than 10_{16}
D plays a similar role as 7_{10}

$D + D = 10 + D - 3 = 1D - 3 = 1A$

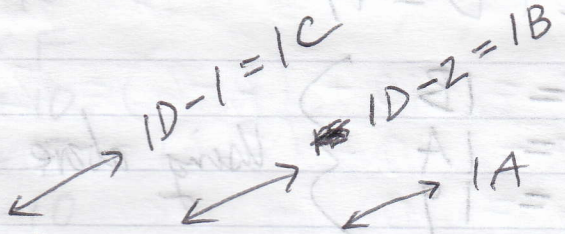
MEMORIZE THIS!

This one is tricky.

$D + D = 1A$

$D+D = 10-3+D = 1D-3$

$1D-1 = 1C$
$1D-2 = 1B$
$1D-3 = 1A$



We covered $D+F$, $D+E$, $D+D$.

$D+C = 1C-3 = 19$ → $1C-1=1B$, $1C-2=1A$, $1C-3=19$

$D+B = 1B-3 = 18$ → $1B-1=1A$, $1B-2=19$, $1B-3=18$

Consider $(11-3=8)_{10}$

(base+1) −3 → base−2

$1B-3 = 18$

↓

$(base+11)-3 = base+8$

$D+A = 1A-3 = 17$
$D+9 = 19-3 = 16$
$D+8 = 18-3 = 15$
$D+7 = 17-3 = 14$
$D+6 = 16-3 = 13$
$D+5 = 15-3 = 12$
$D+4 = 14-3 = 11$
$D+3 = 13-3 = 10$
$D+2 = F$
$D+1 = E$

So $D + C = 1C - 3 = 19$

and $C + D = 19$

$C + F = 1B$
$C + E = 1A$
$C + D = 19$
} Using above thought process.

$C + C \longrightarrow C = 10 - 4$

$\therefore C + C = 10 + C - 4$
$= 1C - 4 = (C - 4) + 10$
$= 8 + 10 = 18$

$C + B = (B - 4) + 10$
$= 17$
$C + A = (A - 4) + 10$
$= 16$
$C + 9 = (9 - 4) + 10 = 15$
$C + 8 = (8 - 4) + 10 = 14$
$C + 7 = (7 - 4) + 10 = 13$
$C + 6 = (6 - 4) + 10 = 12$
$C + 5 = (5 - 4) + 10 = 11$
$C + 4 = 10$
$C + 3 = (3 - 4) + 10 = 10 - 1 = F$
$C + 2 = E$
$C + 1 = D$

Be careful: $C + 3 = F$ (not 9.!)

$10_{16} - 1_{16} = F_{16}$

note:

$F+1=10$
$F+0=F$
$E+2=10$
$E+1=F$
$D+3=10$
$D+2=F$
$C+4=10$
$C+3=F$ $\quad 10+(3-4)=10-1=F$
$B+5=10$
$B+4=10+(4-5)=10-1=F$
$A+6=10$
$A+5=10+(5-6)=10-1=F$

$B+A=10+(A-5)=15$

B is $10-5$:

$10-1=F$
$10-2=E$
$10-3=D$
$10-4=C$
$10-5=B$
$10-6=A$
$10-7=9$

$B+B=10+(B-5)=16$
$B+9=10+(9-5)=14$
$B+8=10+(8-5)=13$
⋮
$B+6=10+(6-5)=11$
$B+5=10$
$B+4=F$

$A+9 = 10+(9-6) = 13$

$A+A = 10+(A-6) = 14$

$A+8 = 10+(8-6) = 12$
$A+7 = 10+(7-6) = 11$
$A+6 = 10$
$A+5 = F$
$A+4 = E$
$A+3 = D$
$A+2 = C$
$A+1 = B$

$A+A = 14$
$B+B = 16$
$C+C = 18$
$D+D = 1A$
$E+E = 1C$
$F+F = 1E$

... to be continued ...

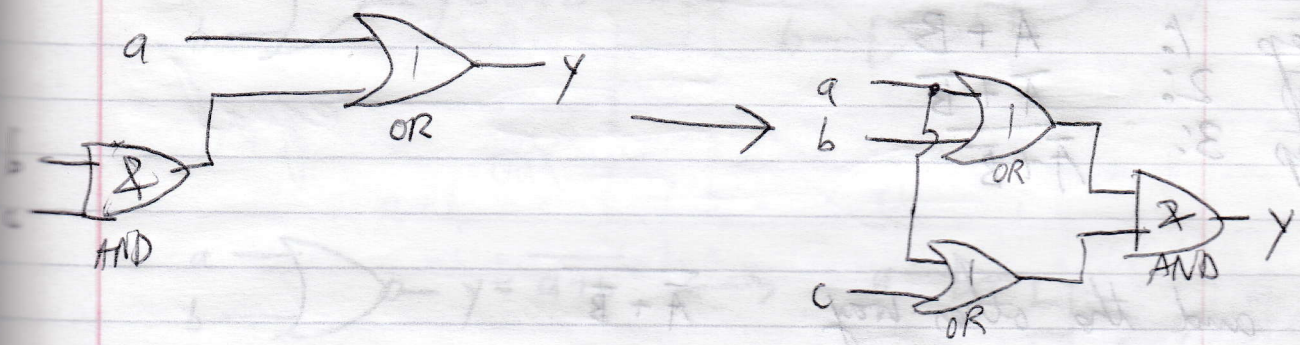
2000.311.11.6.1.17:30 It is that time again. a midterm exam approaches: Computer Architecture...

By no means will my notes below represent a review. I am just scribbling some obscure techgnosis.

Some things are not obvious, especially to a mind trained in mathematics.
In regular algebra $6 + (5 \times 2) \neq (6+5) \times (6 \times 2)$
but with Boolean algebra,

$$a \mid (b \,\&\, c) \rightarrow (a \mid b) \,\&\, (a \mid c)$$

We write as $A + BC = (A+B)(A+C)$
Even though OR has lower presedence than AND, OR will still distribute over the AND operator.



De Morgan Transformations

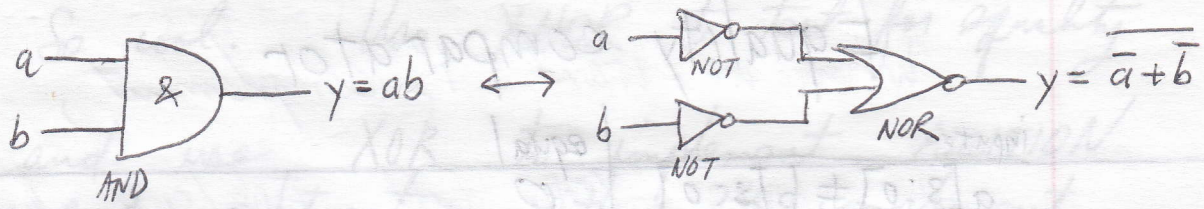
1. Exchange the AND for the OR and vice versa.
2. INVert all variables; exchange 0's for 1's and vice versa.
3. INVert the entire function.
4. Reduce all multiple inversions

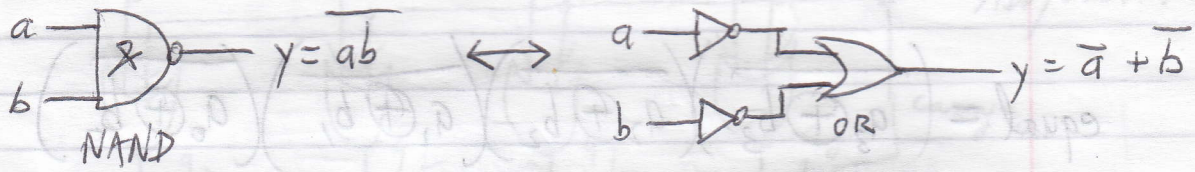
$$y = AB \rightarrow y = a \,\&\, b \rightarrow y = a \wedge b \rightarrow y = a \cap b \text{, etc}$$

step 1: $A + B$
step 2: $\overline{A} + \overline{B}$
step 3: $\overline{\overline{A} + \overline{B}}$

and the other way $\overline{\overline{A} + \overline{B}}$

step 1: $\overline{\overline{A}\,\overline{B}}$
step 2: $\overline{\overline{A}\,\overline{B}}$
step 3: ~~$\overline{\overline{A}\overline{B}}$~~ $\overline{\overline{A}\,\overline{B}}$
step 4: AB





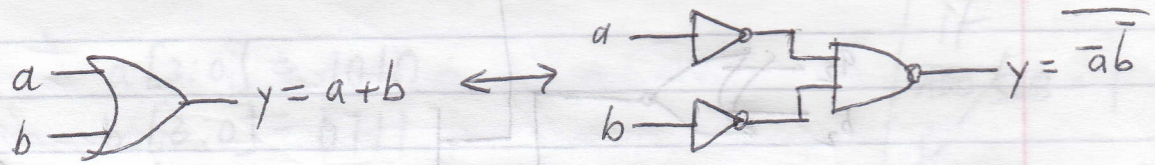
$y = \overline{ab}$

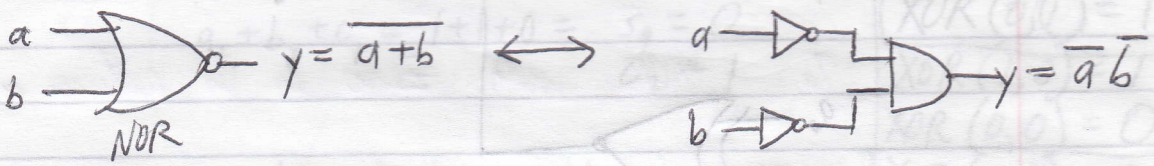
step 1: $\overline{a+b}$

step 2: $\overline{\bar{a}+\bar{b}}$

step 3: $\overline{\overline{a}+\overline{b}}$

step 4: $\bar{a}+\bar{b}$





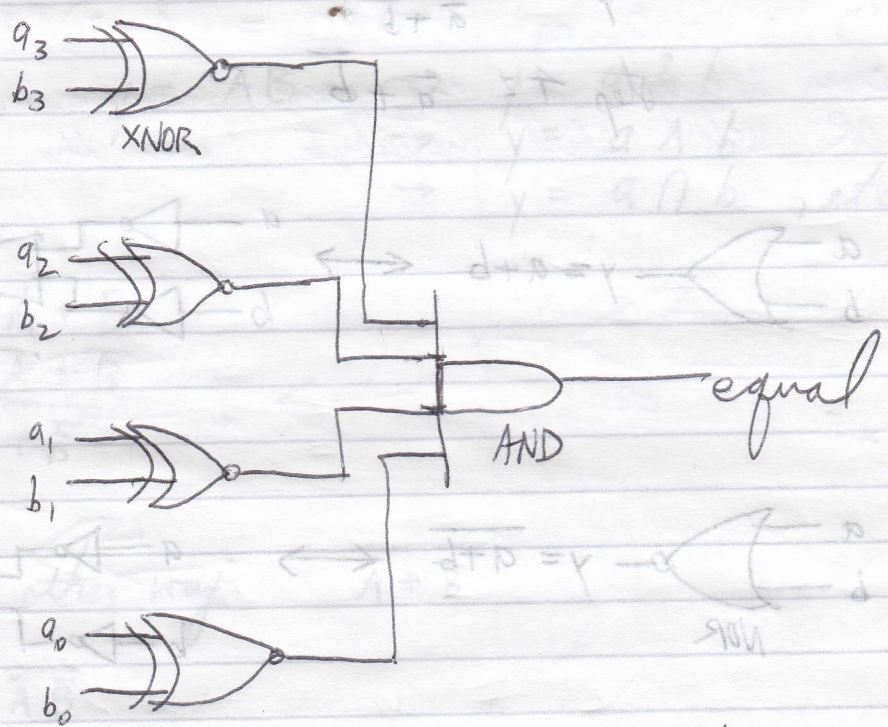
exchange operators [c iv if r]
invert variables
invert function
reduce

Equality comparator

inputs	equal
$a[3:0] \neq b[3:0]$	0
$a[3:0] = b[3:0]$	1

$$equal = \overline{(a_3 \oplus b_3)}\,\overline{(a_2 \oplus b_2)}\,\overline{(a_1 \oplus b_1)}\,\overline{(a_0 \oplus b_0)}$$

$$= \overline{(a_3\bar{b}_3 + \bar{a}_3 b_3)}\,(a_2\bar{b}_2 + \bar{a}_2 b_2)(a_1\bar{b}_1 + \bar{a}_1 b_1)(a_0\bar{b}_0 + \bar{a}_0 b_0)$$



example $a[3:0] = 1010$
$b[3:0] = 0111$

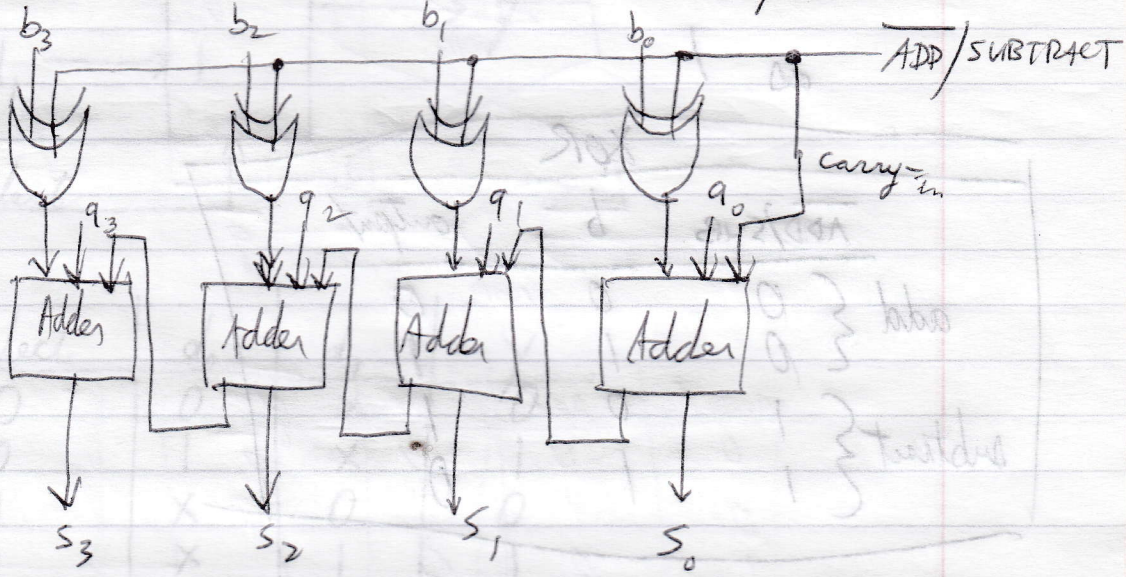
$\overline{a \oplus b} = 0010 = 0$

0 AND 0 AND 0

a	b	OR	XOR	XNOR
0	0	0	0	1
0	1	1	1	0
1	0	1	1	0
1	1	1	0	1

test for equality

So cool. Use XNOR to test for equality and use XOR to implement ADDITION and subtraction with 2's complement.



$a[3:0] = 1010$
$b[3:0] = 0111$

$a + b \Longrightarrow$ $\overline{\text{ADD}}/\text{SUBTRACT}$ line is 0

$a_0 + b_0 = 0 + 1 = S_0 = 1$

$a_1 + b_1 + c_1 = 1 + 1 + 0 = S_1 = 0$
$c_2 = 1$

$a_2 + b_2 + c_2 = 0 + 1 + 1 = S_2 = 0$
$c_3 = 1$

$a_3 + b_3 + c_3 = 1 + 0 + 1 = S_3 = 1$
carry out = 1 discard

$$\begin{array}{r} {\scriptstyle 1\ 1\ 1\ \ } \\ 1010 \\ 0111 \\ \hline 0001 \end{array}$$

result → 0001 ✓

if $\overline{\text{ADD}}/\text{SUB} = 1$ then carry in is 1.

XOR (0, 1) = 1
XOR (1, 0) = 1
XOR (0, 0) = 0
XOR (1, 1) = 0

When we want 1's complement,
we use XOR with $\overline{\text{ADD/SUB}}$ line
as 1

XOR

	$\overline{\text{ADD/SUB}}$	b	output
add	0	0	0
	0	1	1
subtract	1	0	1
	1	1	0

To XOR with a Logical 1 is to negate oneself if only 2 operands.

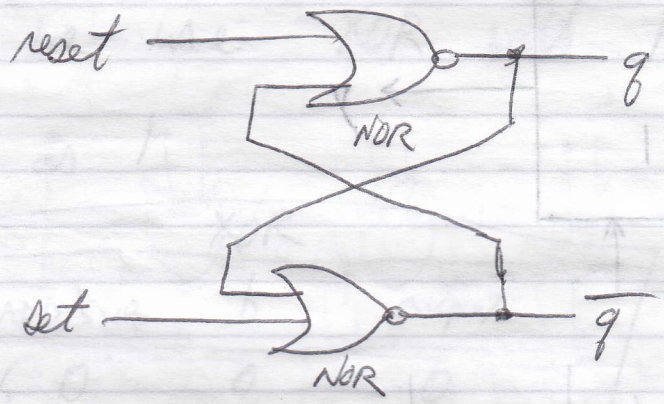
$0 \oplus 1 = (0)(0) + (1)(1) = 1$
$1 \oplus 1 = (1)(0) + (0)(1) = 0$

To XOR with zero is to return oneself.

XOR = 1 if odd # 1's
XOR = 0 if even # 1's

initially 0 one's, so to XOR 0 → 0
initially 1 one, so to XOR 0 → 1
initially 0 one's, so to XOR 1 → 1
initially 1 one, so to XOR 1 → 0

RS latch



reset	set	q	$\overline{q}$
0	0	q	$\overline{q}$
0	1	q	0
1	0	0	1
1	1	X	X

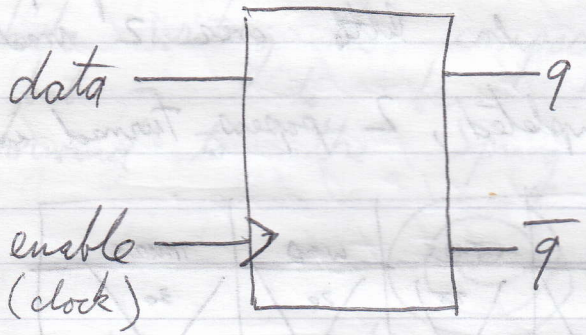
$$q = \overline{(reset + \overline{q})} = (reset)(\overline{q})$$

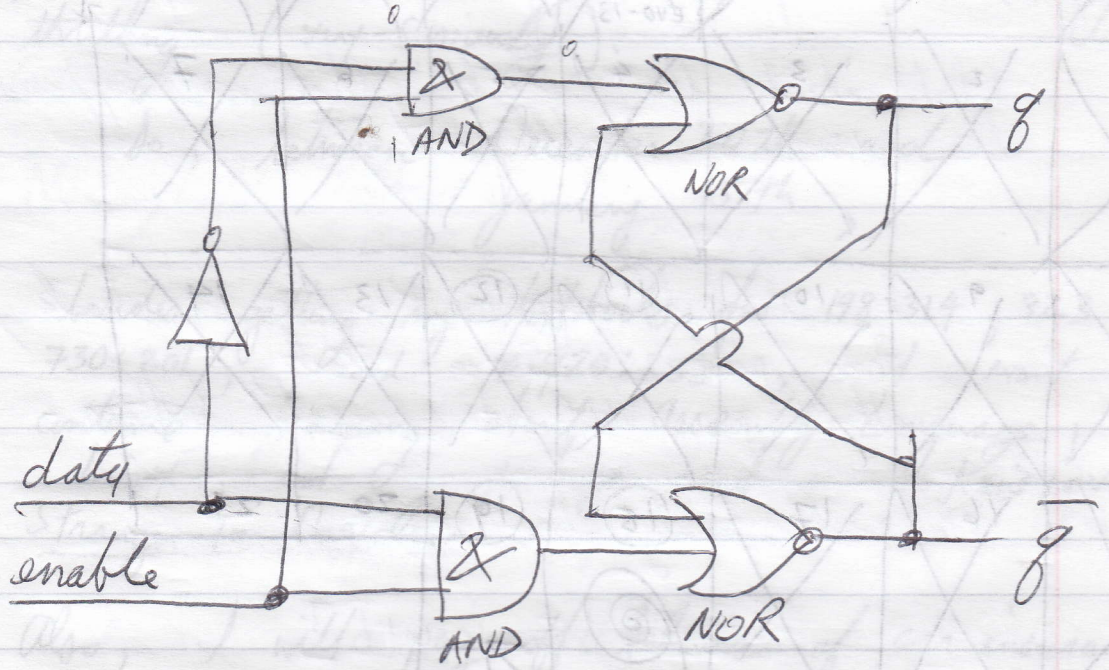
$$\overline{q} = \overline{(set + q)} = (\overline{set})(\overline{q})$$

1 = reset → q = 0
0 = reset → q = q

1 = set → q = 1
0 = set → q = q

D-type latch





enable	data	q	$\overline{q}$
0	X	q	$\overline{q}$
1	0	0	1
1	1	1	0

if a is down at 2088,

2088
2048
40

ld [a], %r3

has object code:

31
-13
18
-5
13

11 00011 000000 00000 1 0 1 0 0 0 0 1 0 1 0 0 ...

op rd op3 rs1 i

$2^{12} = 4096$

$2^5 = 32$ $2^3 = 8$

and a branch works in word units,
where 1 word = 32 bits = 1 line of object code

convert -7_{10} to excess-32 in base 2.

-7 is the value
32 is the bias
∴ the characteristic is 32 − 7 = 25

0 1 1 0 0 1

$2^4 = 16$

$2^3 = 8$

convert 011111_2 to base 16.

$011111 \rightarrow 1F_{16}$

132.2_4 to base 16

$$base^k = 16$$
$$4^k = 16$$
$$\log_4 16 = k = 2$$

$132.2_4 = 01\ 11\ 10.10_2 \rightarrow 0001\ 1110.1000_2$

$\rightarrow 1E.8_{16}$

represent 105.15 with 7-bit excess 64 exponent and normalized 24 bit fraction

$105/2 = 52$ r 1
$52/2 = 26$ r 0
$26/2 = 13$ r 0
$13/2 = 6$ r 1
$6/2 = 3$ r 0
$3/2 = 1$ r 1
$1/2 = 0$ r 1

$1101001 = 64+32+8+1 = 105$

$2^7 \rightarrow 7+64 = 71$
$\rightarrow 1000111$

.15	0.3	0.6	0.2	0.4	0.8	0.6
x 2	2	2	2	2	2	2
0.3	0.6	1.2	0.4	0.8	1.6	1.2

0.2	0.4	0.8	0.6	etc
2	2	2	2	
04	0.8	1.6	1.2	

$.00\overline{1001}$

$0\ 1000111\ \ 1101001001001100110011$